



Terrestrial sources homogenize bacterial water quality during rainfall in two urbanized watersheds in Santa Barbara, CA

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Abstract:

Microbiological contamination from runoff is a human health concern in urbanized coastal environments, but the contamination sources are often unknown. This study quantified fecal indicator bacteria and compared the distributions of human-specific genetic markers and bacterial community composition during dry and wet weather in urban creeks draining two neighboring watersheds in Santa Barbara, CA. In a prior study conducted during exclusively dry weather, the creeks were contaminated with human waste as indicated by elevated numbers of the human-specific Bacteroidales marker HF183 (Sercu et al. in Environ Sci Technol 43:293-298, 2009). During the storm, fecal indicator bacterial numbers and loads increased orders of magnitude above dry weather conditions. Moreover, bacterial community composition drastically changed during rainfall and differed from dry weather flow by (1) increased bacterial diversity, (2) reduced spatial heterogeneity within and between watersheds, and (3) clone library sequences more related to terrestrial than freshwater taxa. Finally, the spatial patterns of human-associated genetic markers (HF183 and *Methanobrevibacter smithii* nifH gene) changed during wet weather, and the contribution of surface soils to *M. smithii* nifH gene detection was suspected. The increased fecal indicator bacteria numbers during wet weather were likely associated with terrestrial sources, instead of human waste sources that dominated during dry weather flow.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Precipitation

Geographic Feature:

resource focuses on specific type of geography

Freshwater, Urban

Geographic Location:

resource focuses on specific location

United States

Climate Change and Human Health Literature Portal

Health Impact:

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Foodborne/Waterborne Disease

Foodborne/Waterborne Disease: General Foodborne/Waterborne Disease

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content